NOAA-ETL & CRYSTAL/FACE

Objectives:

- To document the vertical structure and the dynamical and microphysical properties of cirrus/clouds.
- To validate retrieval techniques and optimize them for tropical & subtropical cirrus/clouds.
- To study the connection between the cloud structure and microphysics and the radiative heating.

MMCR Package
Cloud Profiling Radar with Radiometers

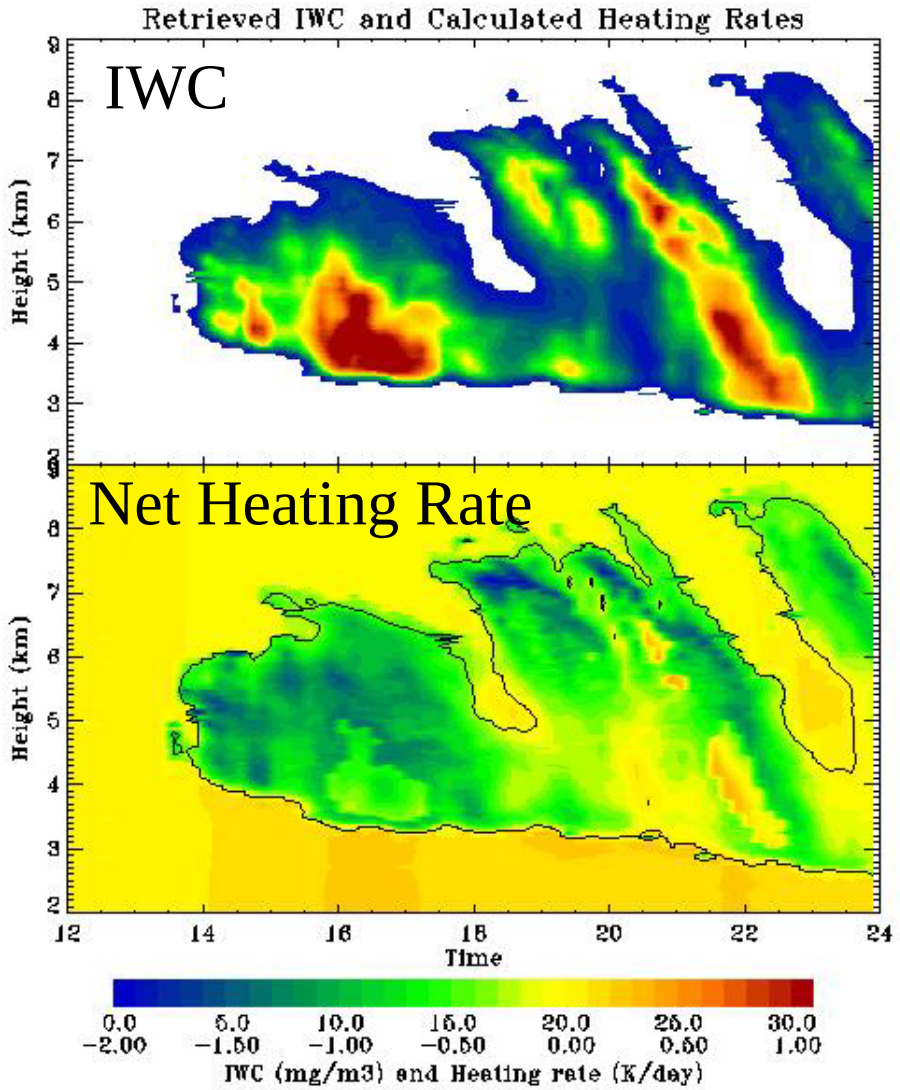
NOAA Environmental Technology Laboratory

Radar: ***Ka-band (8.7-mm) * Doppler * Unattended * Vertical * -40dBZ @10km***

Radiometers: ***microwave 20.6, 31.65 GHz; IR 10.6-11.3 μm***

An Example: MMCR Data and RT Modeling

- Measures (24/7):
  - vertical profiles of radar reflectivity; Doppler velocity and spectral width
  - downwelling T_B (IR & 💻wave)
- Retrieve:
  - Profiles of "D"; IWC; LWC
  - IWP; LWP; ☺
  - 💻wave: PWV and LWP
- Input to RT models:
  - ***e.g…*** heating rate (HR) profiles using CSU-BugsRad



Level 1 Products…

field calibrated data; near real time

- Our top priority…
- Radar moments; infrared T_B; microwave LWP & PWV.
- 6 hour time series images to web; updated every hour.
- Each night: 6-hour plots ‘cleaned’; plots covering 24 hour periods generated.
- Caveats apply (i.e. data/images to be considered preliminary and subject to change)…

Level 2 Products…

preliminary cloud retrievals; daily

- Employing Matrosov Doppler algorithm (and 'simple' algorithms).
- Profiles of "D", R_e, IWC and LWC.
- IWP, LWP and ☺.
- Images sent to ETL web server every 6-12 hours.
- Caveats apply (i.e. data/images to be considered preliminary and subject to change)…

Level 3 Products…

heating rates; case-by-case

- Modeled heating rate profiles.
- Requires sounding data.
- Presently evaluating different models.
- Computed on a case-by-case basis; images sent to web when appropriate.

Final Products…

additional quality control; post processing

- Radar moments.
- Radiometer data.
- Microphysical properties.
- Vertical ice mass fluxes.
- Optical depth and heating rate profiles.
- NB: data available prior to final processing by special request.